

CLAIMS

Sub A 2

1. A toothbrush operable by a user and comprising a handle having a distal end, a head having a proximal end extending from said handle's distal end, said head having bristles extending generally in a first direction designated "forward", said head having a first orientation relative to said handle when said head is relaxed, said head, when a force greater than a predetermined threshold level is applied to said head in a direction generally opposite said first direction, being pivotable relative to said handle out of said first orientation to a second orientation rearward of said first orientation, said head remaining out of said first orientation until it is manually returned by said user to said first orientation.

2. A toothbrush according to claim 1 wherein said second orientation is a specific position of a predetermined angulation from said first orientation.

3. A toothbrush according to claim 2 wherein said second orientation is a specific position at least ten degrees from said first orientation.

4. A toothbrush according to claim 2 wherein said second orientation is approximately twenty degrees rearward of said first orientation.

5. A toothbrush according to claim 1 wherein said head is freely pivotable in said second orientation.

6. A toothbrush according to claim 1 wherein said second orientation is any position different and rearward from said first orientation.

03750 333360

7. A toothbrush according to claim 1 wherein said predetermined threshold level of force is in the range of about two to twelve ounces.

8. A toothbrush according to claim 7 wherein said predetermined threshold level of force is about six ounces.

9. A toothbrush according to claim 1 further comprising a hinge coupling said handle and said head, said hinge comprising at least one spring element engaging said head and said handle and urging said head to remain in said first orientation until said force exceeding said predetermined threshold level is applied.

10. A toothbrush according to claim 9 wherein said hinge further comprises at least one connecting element coupling said handle and said head.

11. A toothbrush according to claim 9 wherein said spring element is a bi-stable spring having separate first and second positions corresponding respectively to said first and second orientations of said head with respect to said handle, said bi-stable spring, when said force exceeding said threshold is applied to said head, snaps said head to said second orientation and maintains said head at said second orientation until said head is manually pushed forward until said spring snaps said head back to said first orientation.

12. A toothbrush according to claim 9 wherein said threshold level of force is substantially the same for causing said bi-stable spring to snap from its first position to its second position and for causing said bi-stable spring to snap from its second position to its first position.

13. A toothbrush according to claim 1 wherein said handle and head

001150-929350

comprise a single continuous molded product.

14. A toothbrush according to claim 9 wherein said handle and head are separate elements, and said handle's distal end and said head's proximal end are coupled together forming said hinge, and said spring element is situated between and engaging said distal and proximal ends of said handle and said head respectively.

15. A toothbrush according to claim 14 wherein said handle's distal end and said head's proximal end comprises hinge elements of said hinge, and said spring element comprises a spring-biased detent in one said hinge elements and the other of said hinge elements has a first detent-engaging element, said detent and first detent-engaging element comprising a spring coupling, whereby said predetermined threshold force level is the force required to overcome the spring coupling to release said head to pivot out of said first orientation.

16. A toothbrush according to claim 15, further comprising a second detent-engaging element spaced from said first detent-engaging element on said other of said hinge elements, said second detent-engaging element situated to releasably secure said head in said second orientation rearward of said first orientation when said head is pivoted out of said first orientation.

17. A toothbrush according to claim 9 wherein said handle's distal end and said head's proximal end comprises hinge elements of said hinge, and wherein said spring element comprises a resilient element extending from one of said hinge elements and releasably engaging the other of said hinge elements.

18. A toothbrush operable by a user and comprising a head with bristles which extend in a generally first forward direction from said head, a handle, and

a hinge connecting said head and said handle, said head having a normal position relative to the handle, said hinge comprising biasing means urging said head to remain in said normal position, said head being pivotable about said hinge from said normal position backwards in a second direction generally opposite from said first direction when a force exceeding a predetermined threshold level of said biasing means is applied to said head in said second direction, said head remaining out of said normal position until said head is manually returned to said normal position by said user.

18 19. A toothbrush according to claim 9 wherein said hinge comprises a pre-stressed bi-stable spring having two alternative shapes, said spring in its pre-stressed state being generally stiff and tending to stay in such state until a force exceeding a predetermined threshold level is applied to said spring which causes it to snap to its other shape, said spring coupled to said head and to said handle, whereby said head automatically pivots to its second orientation when a force exceeding said threshold level force is applied thereto.

20. A toothbrush according to claim 19 wherein said head automatically returns to its first orientation when a force exceeding said threshold force is applied to said head in said first direction.

21. A toothbrush according to claim 20 wherein said handle has a central longitudinal axis, and said bi-stable spring comprises a central strip generally parallel to said handle axis and two tension strips adjacent and generally parallel to said central strip, said central strip being resilient and in compression and having a bow configuration.

22. A toothbrush according to claim 20 wherein each of said tension strips is bendable in the general area of their connection to said head.

00503636-053400

23. A toothbrush according to claim 19 wherein said hinge comprises a bi-stable spring formed as an elongated resilient dish-shaped element having a generally concave configuration and a pair of tension strips adjacent and generally parallel to said spring element, said spring element being in compression with its distal end rigidly extending from said head.

24. A toothbrush according to claim 23 wherein each of said tension strips is bendable in the general area of its connection to said head.

25. A toothbrush according to claim 9 wherein said hinge comprises a yoke at said distal end of said handle, a tongue at said proximal end of said head, a pivot axis extending through said yoke and tongue, whereby said head is movable between two angular positions, said hinge further comprising restraining means releasably restraining said tongue in at least one of said positions relative to said yoke.

26. A toothbrush comprising a handle, a head with bristles and a neck interconnecting said handle and said head in a predetermined first angular relationship, said head being bendable relative to said handle about a bend axis in said neck, said neck having a predetermined stiffness wherein said neck resists bending of said head relative to said handle, said neck being bendable about said bend axis to a second angular relationship different from said first angular relationship and back again when a force is applied to said head that overcomes said stiffness of said neck.

27. An automatic pressure release toothbrush operable by a user and comprising a handle, a head extending from said handle, said head having bristles extending generally in a first direction designated "forward", said head having a first normal, operable orientation relative to said handle, said head, when a force greater than

001150-929850

a predetermined threshold level is applied to said head in a direction generally opposite said first direction, automatically pivoting relative to said handle out of said first orientation to a second inoperable orientation rearward of said first orientation, said head remaining in said second orientation until it is manually returned by said user to said first orientation.

28. A method of reducing the risk of damaging tooth enamel and/or gums during brushing of a person's teeth with a toothbrush, comprising:

- a- providing a toothbrush with a handle, head and bristles extending from said exceeding a head,
- b- providing a pivotable joint between said handle and said head, and
- c- configuring said pivotable joint such that upon application of a force predetermined threshold level on said head, said head will automatically pivot or bend producing a toothbrush configuration which is either inoperative or so awkward as to effectively preventing further brushing.

29. A method of reducing the risk of damaging tooth enamel and/or gums during brushing of a person's teeth with a toothbrush, comprising:

- a- providing a toothbrush with a handle, head and bristles extending from said head,
- b- providing a pivotable joint at a selected location along the length of said handle and head, and
- c- configuring said pivotable joint such that upon application of a force exceeding a predetermined threshold level on said head, said joint will automatically change said toothbrush configuration into one that will be either inoperative or so

001150-929850

15-
to effectively prevent
ing a person how to a
while brushing his/h
ash with a handle, he
e joint at a selected
ead, and
otable joint such tha
edetermined thresho
atically disable the

- a- providing a toothbrush with a handle, head and bristles extending from said head,
- b- providing a pivotable joint at a selected location along the length of said handle and head, and
- c- configuring said pivotable joint such that upon application of a force exceeding a predetermined threshold level on said head, said joint will automatically disable the toothbrush from further use.